Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Experimental Validation of Dense Plasma Transport Models using the Z-Machine[1] KRISTIAN BECKWITH, PATRICK KNAPP, THOMAS MATTSSON, KYLE COCHRANE, LUCAS STANEK, Sandia National Laboratories, CLAIRE KOPENHAFER, MICHAEL MURILLO, Michigan State University, JEFFREY HAACK, Los Alamos National Laboratory — Mixing of cold, higher-Z elements into the fuel region of an inertial confinement fusion target spoils the fusion burn efficiency. Recently, there has been a surge in the development of dense plasma transport modeling and the associated transport coefficients; however, experimental validation remains in its infancy. To address this gap, Sandia National Laboratories is developing a new experimental platform at the Z-facility to investigate plasma transport in dense plasmas that span the entire warm dense matter regime. This platform is being developed to measure species transport across a V/CH interface. In order to interpret measurements made using this experimental platform, modeling tools that incorporate transport effects in strongly coupled plasmas are required. Our team have utilized new advances in multi-species kinetic theory, collision models applicable to strongly coupled plasmas and modeling of degenerate electron plasmas to develop such a capability. The resulting kinetic transport code has been applied, along with state-of-the-art radiation hydrodynamic codes, to model the experiments. Results from this modeling effort highlight the importance of strong electric fields in driving interfacial mixing.

[1]SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525. SAND2019-7120 A

Kristian Beckwith
Sandia National Laboratories

Date submitted: 03 Jul 2019 Electronic form version 1.4